

**Ex Parte Presentation:
Impact of Unlicensed Devices on
Wireless Microphones**

(ET Docket 02-380)

29 October, 2003

**Shure Incorporated
Niles, Illinois**

Today's Presenters

- **Ahren Hartman**
 - *Staff Engineer, Advanced Development*
- **Edgar Reihl, P.E.**
 - *Principal Engineer and Director, Global Compliance*
- **Sandy Schroeder**
 - *Director, Corporate Market Development*
- **Jeff Krull**
 - *Vice President, Engineering*

Who We Are

■ *Shure is the leading manufacturer of wired and wireless microphones in the U.S.*



© 2003 ABCNEWS Internet Ventures

- 75+ year reputation for quality products
- Shure's CQE Division maintains a full EMC lab; building new anechoic RF test facility that will be A2LA/NVLAP accredited
- Actively participates in FCC rule-making issues
- Member of ETSI, USCEEL; ISO certified

SHURE

Wireless Microphones at Work -

Where's the microphone?



Answer: It's hidden under second base!

Fox Sports patented this concept in 1999 to enhance the audio experience of sports broadcasting

© 2003 FOX Interactive Television, LLC

Wireless Microphones are classed as Part 74, Low Power Auxiliary Stations, and successfully share the TV spectrum as secondary users

Some wireless microphone uses --

- Broadcast operations
- Houses of worship
- Businesses
- Theatres
- Government
- Movie making
- Program production
- Sports

SHURE

Wireless Microphone

Technical Overview

- Professional audio quality: 15 kHz BW, 100+ dB dynamic range, no dropouts
- Primarily analog FM
- Occupied bandwidth: 200 kHz
- Typical power: <50 mW ERP
- Working range: 100 meters
- Antenna diversity reception

Why Are We Here?

- *Shure is concerned with the proposal to allow unlicensed devices to operate in the TV bands*
 - Unlicensed devices in the TV bands will interfere with wireless microphones
- *Harmful interference will cause widespread havoc to wireless microphones users and audiences*

Why is Shure Interested?

- ***Wireless Microphones are essential to today's dynamic Radio and TV programming...***
 - Large productions like the Super Bowl, or a major political convention, require 50 –100 wireless channels to operate simultaneously
- ***... And require a known, stable spectrum environment to operate well***
 - Professional users expect the highest sound quality from their wireless microphones
 - They cannot tolerate harmful interference from unlicensed devices

SHURE

Why is Shure Interested?

- *Sources of interference to wireless microphones are hard to find and correct, even for professionals*
 - It would be extremely difficult to resolve wide-scale harmful interference problems once millions of unlicensed devices are in the hands of the public
 - Imagine a hotel's unlicensed WLAN-based computer network interfering with a film production crew's wireless microphones...

SHURE

“Listen Before Talk” Technology is not the Answer

- *Proposed “Listen Before Talk” technology will not alleviate harmful interference from unlicensed devices to wireless microphones*
 - The previous hotel WLAN computer network scenario is not solved by “Listen Before Talk”
 - Unlicensed devices don’t “know” about wireless microphones making it impossible to avoid interference

“Listen Before Talk” Technology is not the Answer

■ *Consider another example*

- The singer of the National Anthem at the Super Bowl performs a rehearsal, the microphone is then turned off to change the battery
- A nearby unlicensed device listens for the now open channel and begins transmitting
- When the singer switches the microphone on and begins, the unlicensed device is now interfering with the microphone
- Singer’s voice is garbled and intermittent before millions of people

**“Listen Before Talk” does not prevent
this from happening.**

Challenges to the DTV Transition

- *The DTV transition is at a critical point, and could be further threatened if unlicensed devices cause harmful interference*
 - The presence of even a small amount of additional RF “smog” from nearby unlicensed devices could mean the difference between acceptable DTV reception and no reception at all

What's the Solution?

- *Shure recommends locating all new wireless unlicensed devices together outside the TV bands*
 - Unlicensed devices should use the 3.65-3.70 GHz band

Why 3.65-3.70 GHz?

- Unlicensed devices at 3.65 GHz will be more controlled, reducing interference to neighboring devices
 - Easier to make smart, directional antennas
 - Propagation loss promotes efficient frequency reuse - 3.65 GHz less apt to penetrate brick and concrete than UHF

Benefits of Recommendation

- *Wireless microphones continue enabling dynamic Radio and TV broadcast programming without interference*
- *FCC succeeds in establishing new unlicensed spectrum outside TV bands*
- *Avoids complaints from existing licensed wireless users about unlicensed devices*
- *Avoids unnecessary threats to a successful DTV rollout*

SHURE

Concluding

- Shure fully supports the need for the Commission to establish new unlicensed spectrum, but not at the expense of the established and licensed broadcast TV and wireless microphone users
 - **Unlicensed devices in the TV bands will interfere with wireless microphones**
- Shure recommends allocating new unlicensed device spectrum outside the

TV bands